



## 1965 OPERATING COST SUMMARY

# OWRC WATER POLLUTION CONTROL PLANTS

TD  
367  
.A56  
064  
1965  
MOE

LIBRARY COPY

FEB 22 1968

ONTARIO WATER  
RESOURCES COMMISSION

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

LABORATORY & RESEARCH LIBRARY

MINISTRY OF THE ENVIRONMENT

**TD  
367  
.A56  
064  
1965**

1965 operating cost summary :  
water pollution control plants.

81561



## 1965 OPERATING COST SUMMARY

### WATER POLLUTION CONTROL PLANTS

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations.



*Environment Ontario*

Laboratory Library  
125 Resources Rd.  
Etobicoke, Ontario M9P 3V6  
Canada



PLANTS INCLUDED IN REPORT

PRIMARY

			<u>Sludge Handling</u>	<u>Design Flow (MGD)</u>
1.	Belleville	61-S-84	Digestion	3.0
2.	Fort Erie	59-S-39	Digestion	1.8
3.	Fort Frances	60-S-59	Digestion	2.0
4.	Fort William	61-S-91	Digestion	6.0
5.	Owen Sound	60-S-68	Digestion	3.0
6.	Point Edward	59-S-36	Digestion	0.57
7.	Port Arthur	58-S-13	Digestion	4.0
8.	Port Dover	62-S-115	Vacuum Filtration	2.1
9.	Sault Ste. Marie	59-S-20	Vacuum Filtration	8.0
10.	Timmins	60-S-71	Digestion	3.0
11.	Trenton	57-S-4	Digestion	1.0

CONVENTIONAL ACTIVATED SLUDGE

12.	Brantford	58-S-11	Digestion, Vacuum Filtration	12.5
13.	Brampton	58-S-14	Digestion	2.0
14.	Burlington D. L.	60-S-51	Digestion	2.5
15.	Burlington E. G.	58-S-28	Digestion	0.75
16.	Coniston	57-S-8	Digestion	0.26
17.	Elmira	61-S-96	Digestion	0.68
18.	Fergus	58-S-23	Digestion	0.60
19.	Galt	61-S-90	Digestion, Vacuum Filtration	5.0
20.	Georgetown	58-S-17	Digestion	1.5
21.	Huntsville	58-S-15	Digestion	0.25

TABLE OF CONTENTS

YEARBOOK

NAME	POSITION	DATE	POSITION
0.8	president	02-8-80	assistant
2.1	secretary	02-8-80	vice pres.
0.9	treasurer	02-8-80	executive
0.8	auditor	10-2-79	executive
0.6	assistant	02-8-80	executive
2.0	assistant	02-8-80	assistant pres.
0.9	assistant	01-6-80	assistant
1.8	assistant manager	24-8-80	executive
0.8	assistant manager	02-8-80	executive
0.6	assistant	17-8-80	assistant
0.1	assistant	4-8-80	assistant

APPENDIX OF VARIOUS DOCUMENTS

2.91	memorandum	02-8-80	assistant
0.4	memorandum	01-8-80	assistant
0.3	memorandum	12-8-80	assistant
01.0	memorandum	02-8-80	assistant
00.2	memorandum	8-8-80	assistant
00.0	memorandum	02-8-80	assistant
00.0	memorandum	02-8-80	assistant
0.2	memorandum	02-8-80	assistant
2.1	memorandum	12-8-80	memorandum
02.0	memorandum	02-8-80	memorandum

22.	Kingston Twp.	61-S-98	Digestion	0.83
23.	Kitchener	58-S-19	Digestion, Vacuum Filtration	13.5
24.	Lakeview	59-S-43	Digestion	5.0
25.	Markham	59-S-40	Digestion	0.334
26.	Nepean Twp.	59-S-35	Digestion	1.5
27.	Newmarket	61-S-87	Digestion	2.0
28.	North Bay	58-S-10	Digestion	4.0
29.	Orangeville	58-S-16		0.75
30.	Port Colborne E.S.		Digestion	0.85
31.	Port Colborne W.S.	59-S-47	Digestion	0.9
32.	Preston	59-S-46	Vacuum Filtration	1.8
33.	Richmond Hill	57-S-6	Digestion	1.6
34.	Sidney Twp.	62-S-121	Digestion	0.12
35.	Simcoe (Combined)	62-S-120	Digestion	2.0
36.	Stratford	57-S-2	Digestion	4.0
37.	Streetsville	57-S-5	Digestion	0.8
38.	Tillsonburg	58-S-12	Digestion	0.67
39.	Waterloo	58-S-122	Vacuum Filtration	4.0

TOTAL OXIDATION

40.	Burlington Sky.	62-S-105	Total Oxidation	3.125
41.	Elora	62-S-125	Total Oxidation	0.083
42.	Moore Twp.	61-S-88	Total Oxidation	0.32
43.	Paris	59-S-34	Total Oxidation	0.5
44.	Westminster	59-S-33	Total Oxidation	0.25
45.	Frankford (Trickling Filter)	57-S-9		0.12



## OPERATING COSTS

The total costs of operating sewage treatment plants as used in this report are those involving the payroll of staff employed at the plants, fuel, power, chemicals, general supplies, equipment, repair and maintenance, sundry and water. The cost of head office supervision, including travel, accounting, purchasing and inspection is not included in the operating costs shown for each project.

An explanation of items included in each of the categories of the operating costs is as follows:

1. Payroll - Regular operators' salaries including pension and Workmen's Compensation payments.  
- Casual payroll - Salaries of labour employed on a temporary or part-time basis in time of staff shortage or for part-time work. Workmen's Compensation payments are also included.
2. Fuel - Includes fuel oil, natural gas, and/or propane used for heating.
3. Power - Includes hydro electric power and natural gas, gasoline, diesel oil if used for power generator.
4. Chemicals - Includes chlorine, ferric chloride, hydrated lime, pickle liquor, alum, sodium hypochlorite, odour control chemicals, activated carbon, sodium chloride, pipe cleaning materials (where applicable).
5. General Supplies - Includes laboratory reagents, laboratory equipment replacement, cleaning materials, lubricants, stationery, uniforms, light bulbs, instrument charts, books.
6. Equipment - Includes equipment to be used in the treatment process, laboratory, building and grounds and small tools.



7. Maintenance - Includes goods and services (with the exception of OWRC staff) used in repairing and maintaining process, electrical and building equipment, inspections, packing, paint, etc.
8. Sundry - Includes express charges, telephone, telemetering, stamps, sludge haulage, etc.
9. Water - Includes all charges for water.
10. Travel - Includes operators' travel to local hardware stores, railroad station, conferences, conventions, etc. The cost of accommodation and meals associated with conferences and conventions is also included.

The operating costs of 45 OWRC operated sewage treatment plants are summarized in Tables No. I, No. II and No. III. In each table the plants are grouped as to the type of treatment, primary, conventional activated sludge or total oxidation. Frankford, a small trickling filter plant, is listed after the total oxidation plants in all tables.

Table No. I summarizes the total 1965 operating costs under each of the 11 cost categories for each plant. The four main cost categories; labour, power, maintenance and sludge disposal, are further described in Table No. II as to their percent of the total operating costs and their costs per million gallons of sewage treated. Table No. III summarizes the 1965 total average operating costs per million gallons of sewage treated, per pound of  $BOD_5$  removed and per pound of suspended solids removed. Average values are given for each of the three types of treatment.

Figures No. I and No. II show a statistically derived regression line, by the least squares method, to represent the total operating costs per million gallons of sewage treated for the various design capacities. Also



shown are the limits of one standard error on each side of the regression line. Figure No. I represents conventional activated sludge treatment plants and Figure No. II represents primary treatment plants. A similar analysis was done in Figures No. III and No. IV for operating cost per million gallon of sewage treated for the actual flows treated by each plant.



TABLE I

## OMRC WATER POLLUTION CONTROL PLANTS

## OPERATING COSTS

1965

## PRIMAY TREATMENT

PROJECT	TOTAL	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIP.	REPAIRS & MAINT.	SUNDY	WATER	TRAVEL
BELLEVILLE	45,125.01	14,269.93	841.22	2105.67	7900.29	2119.75	1286.52	817.77	1642.63	12219.56	1352.57	565.90
FORT ERIE	24,836.97	10,524.84	794.97	1032.56	4563.51	1393.57	1028.08	526.29	800.02	3853.20	319.93	319.93
FORT FRANCES	29,310.65	14,877.03	103.44	2115.43	4811.01	1164.57	1354.08	1182.25	706.77	1569.95	200.00	1226.12
FORT WILLIAM	53,523.57	26,592.36	2374.99	3210.48	7304.01	3096.51	1990.18	2472.80	2083.30	3520.17	243.90	634.87
OWEN SOUND	34,109.32	11,123.26	4336.79	1550.20	4775.78	1421.58	1015.25	781.13	1929.94	5217.12	1568.11	390.16
POINT EDWARD	13,272.64	6,059.86	1620.03	879.48	1062.20	470.93	389.51	673.74	1237.50	725.21	154.18	
PORT ARTHUR	44,533.19	14,325.94	7424.93	1314.30	5584.06	3136.35	1962.13	1347.20	1322.71	6106.06	1772.18	237.33
PORT DOVER	23,343.94	10,257.87	6028.10	6028.10	2132.02	666.37	1788.06	1638.88	233.67	599.37		
SAULT SITE. MARIE	122,349.41	50,678.34	3738.70	2971.86	16196.72	11267.16	2954.30	2598.63	7974.05	21253.86	2178.76	537.03
TIMMINS	31,001.30	9,835.79	3709.38	3117.45	4701.11	2060.30	1467.43	959.19	1465.59	3102.10	582.96	
TRENTON	19,519.53	6,298.74	399.74	218.44	2552.08	2240.25	988.16	1377.90	1676.00	1305.47	2097.41	365.34

## CONVENTIONAL ACTIVATED SLUDGE SECONDARY PLANTS

BRANTFORD	185,704.83	108,765.52	2699.42	1149.59	24748.80	23175.03	4908.77	1686.04	5737.88	10296.39	1923.87	613.52
BRAMPTON/ CHINGUAOUSY	55,578.76	16,615.31	6227.01	6294.18	5152.57	1617.07	1961.09	4010.08	11572.76	1893.29	335.40	
BURLINGTON D.L.	37,586.43	15,963.55	755.20	140.31	6186.78	4186.27	888.30	597.78	1163.40	7468.47	166.17	70.20
BURLINGTON E.G.	21,966.58	11,887.91	765.66	3452.32	1112.46	693.30	363.59	716.49	2162.07	599.88	213.00	
CONISTON	12,495.59	5,195.03	2164.42	486.31	1056.58	339.91	388.85	238.56	1219.99	679.20	726.74	
ELMIRA	26,960.67	14,387.91	1633.87	1800.19	2505.42	1356.93	1454.24	659.15	430.43	1135.89	1130.44	466.15
FERGUS	21,760.15	9,305.11	259.44	582.74	1278.14	1098.98	868.03	957.08	857.88	4549.83	852.57	250.35
GALT	73,672.49	33,303.33	4876.88	4193.87	7142.65	10026.94	2822.20	2174.42	5226.70	2679.96	881.34	344.20
GEORGETOWN	31,209.58	15,707.88	338.57	576.97	2964.74	1647.90	1344.95	1158.81	2127.63	4686.78	655.35	
HUNTSVILLE	9,949.50	4,289.99	490.00	456.01	1392.12	215.53	422.63	51.34	546.70	1452.29	436.74	196.15
KINGSTON	23,348.09	8,361.05	1224.98	869.32	5402.27	444.63	920.80	498.35	2899.26	1524.13	603.30	
KITCHENER	225,144.17	86,658.05	7356.77	324.48	27190.85	46261.29	5454.80	4776.41	14996.09	31320.98	179.28	595.17
LAKEVIEW	140,366.45	44,246.75	2798.19	92.46	17658.69	10556.87	3721.67	2453.37	4113.83	54700.89	680.28	(656.55)
MARKHAM VILLAGE	15,909.13	9,012.72	31.35	860.90	1875.82	672.09	506.12	382.31	1001.38	740.25	710.31	115.88
NEPEAN TWP.	32,490.61	13,964.02	889.11	798.64	6732.66	1174.07	1305.71	1967.99	3855.67	1058.26	764.48	
NEWMARKET	32,566.48	14,931.03	666.54	1344.63	6136.11	1745.41	1082.60	690.22	419.68	4885.16	248.00	417.00
NORTH BAY	79,171.60	34,491.48	1303.22	125.21	12219.26	1352.28	2438.78	544.38	6008.42	18484.42	1763.92	44C.23



TABLE I  
CONVENTIONAL ACTIVATED SLUDGE SECONDARY PLANTS

OPERATING COSTS CONT'D



TABLE II

## O.W.R.C. WATER POLLUTION CONTROL PLANTS

## OPERATING COSTS

1265

## PRIMARY TREATMENT

PROJECT	TOTAL OPERATING COSTS	LABOR COSTS		POWER COSTS		MAINTENANCE		SLUDGE DISPOSAL		
		TOTAL	% OF TOTAL	TOTAL	% OF TOTAL	\$ PER M.G.	% OF TOTAL	\$ PER M.G.	% OF TOTAL	
BELLEVILLE	45121.81	33.5	7.30	2300.29	17.5	3.82	3746.92	1.81	1011.00	
FORT ERIE	24835.97	45.6	21.04	4563.51	18.3	8.52	2354.39	4.40	575.12	
FORT FRANCES	14980.47	51.1	26.62	4811.01	16.4	8.55	3243.10	5.76	2.3	
FORT WILLIAM	53523.57	54.1	42.83	7304.01	13.6	10.80	6546.28	9.68	1.07	
OWEN SOUND	34109.32	15460.05	45.3	12.50	4775.78	14.0	3.86	3726.32	10.2	6.49
POINT EDWARD	13272.64	6059.86	45.7	85.13	879.48	6.6	12.36	1534.18	11.6	2.11
PORT ARTHUR	44533.19	24750.87	48.8	11.55	5584.06	12.5	2.96	4632.04	10.4	6.22
PORT DOVER	23343.94	10257.87	43.9	80.82	6028.10	25.8	47.50	4092.91	17.5	2.53
SAULT STE. MARIE	122349.41	54417.04	44.5	19.22	16196.72	13.2	5.72	3526.98	11.1	3.53
SIMIENS	31001.30	15351.11	43.7	12.75	4701.11	15.2	4.43	3892.21	12.6	8.2
TRENTON	19519.53	6698.40	34.3	31.17	2552.08	13.1	11.88	4042.06	2.07	18.81
AVERAGE			44.6	31.91		15.1	10.95		12.4	9.83
										5.7
										2.66

## CONVENTIONAL ACTIVATED SLUDGE SECONDARY PLANTS

PROJECT	TOTAL OPERATING COSTS	LABOR COSTS		POWER COSTS		MAINTENANCE		SLUDGE DISPOSAL		
		TOTAL	% OF TOTAL	TOTAL	% OF TOTAL	\$ PER M.G.	% OF TOTAL	\$ PER M.G.	% OF TOTAL	
BRANTFORD	185704.83	111464.94	60.0	46.53	27748.80	13.3	10.33	12332.69	6.6	5.15
BRAMPTON	55678.76	22842.32	41.0	27.19	6294.18	11.3	7.49	7588.24	13.6	9.03
BURLINGTON D.L.	37586.43	16718.75	44.5	27.56	6186.78	16.5	10.20	1649.48	7.1	4.37
BURLINGTON E.G.	21966.58	1187.91	54.1	39.65	3452.32	15.7	11.51	1773.28	8.1	5.91
CORNWALL	12495.57	7359.45	58.9	100.99	1056.58	8.5	14.50	1847.48	14.8	25.35
ELMIRA	26950.67	16021.78	59.4	101.14	2505.42	9.3	5.82	2543.82	9.4	16.06
FERGUS	21760.15	9564.55	44.0	45.91	1278.14	5.9	6.13	2682.99	12.3	12.88
GALT	73672.49	38180.21	51.8	20.59	7142.65	9.7	3.85	10223.32	13.9	5.51
GEORGETOWN	31209.58	16046.45	51.4	46.30	2964.74	9.5	8.56	4631.39	14.8	13.36
HUNTSVILLE	9949.50	4779.99	48.0	71.72	1392.12	14.0	20.89	1020.67	10.3	15.31
KINGSTON TWP.	23348.09	10186.03	43.6	56.24	5402.27	23.1	29.83	4318.41	18.5	23.34
KITCHENER	225144.17	94044.82	41.8	28.25	27190.85	12.1	8.17	25227.30	11.2	7.58
LAKEVIEW	140366.45	47044.94	33.5	17.93	17658.68	12.6	6.73	10288.87	7.3	3.92
MARKHAM VILLAGE	15909.13	9044.07	56.8	77.38	1875.82	11.8	16.05	1889.81	11.9	16.17
NEPEAN TWP.	32490.61	14853.13	45.7	16.76	6732.66	20.7	7.60	7109.37	21.9	8.05
NEWMARKET	32566.48	15597.67	47.9	32.75	6136.11	18.8	12.88	2192.50	6.7	4.60
NORTH BAY	79171.60	35794.70	45.2	25.94	12219.26	15.4	8.85	8991.58	11.4	6.52
ORANGEVILLE	13525.19	4818.48	35.6	22.32	1315.27	9.7	6.09	1218.27	9.0	5.64
PORT COLEBINE	64498.43	41537.58	64.4	56.78	8898.75	13.8	12.16	7224.88	11.2	9.88
PRESTON	36292.57	18271.25	50.3	55.92	4143.37	11.4	12.63	3204.77	8.8	9.81
RICHMOND HILL	50984.04	19001.52	37.3	33.36	6745.71	13.2	11.84	5372.68	10.5	9.43
SIDNEY TWP.	76771.10	2827.31	36.8	35.11	955.76	12.5	11.88	6945.59	9.0	8.63



TABLE II

## OPERATING COSTS (CONT'D)

PROJECT	TOTAL OPERATING COSTS	LABOR COSTS		POWER COSTS		MAINTENANCE		SLUDGE DISPOSAL	
		TOTAL	% OF TOTAL	\$ PER M.G.	TOTAL	% OF TOTAL	\$ PER M.G.	TOTAL	% OF TOTAL
SIMCOE	40334.44	18429.15	45.7	32.59	9791.04	24.3	17.31	5154.06	12.8
STRATFORD	57079.98	31965.00	54.1	27.04	5306.61	9.3	4.64	7341.60	12.9
STREETSVILLE	14565.95	7275.17	49.9	36.35	1498.06	10.3	7.49	1076.07	7.4
TILLSONBURG	25142.33	9659.05	38.4	43.22	4533.71	18.0	20.29	4365.74	17.4
WATERLOO	140427.32	43601.88	31.0	47.13	19985.72	14.2	21.63	25903.28	18.4
AVERAGE			47.2	43.43		13.5	12.05		11.7
								10.95	
<b>TOTAL DATA FOR PLANTS</b>									
BURLINGTON SKY.	51736.82	19986.57	38.6	20.71	20992.60	40.6	21.75	3380.80	6.5
ELORA	6679.39	4075.83	61.0	310.87	1035.26	15.5	78.96	958.74	14.4
MOORE TWP.	12595.65	5374.40	42.7	164.75	3456.32	27.4	105.95	1467.02	11.6
PARIS	8109.72	4623.93	57.0	30.88	1701.86	21.0	11.37	716.51	8.8
WESTMINSTER	10614.93	5758.27	54.2	103.34	2231.57	21.0	40.05	1395.00	13.1
AVERAGE			44.4	32.73				32.8	
FRANKFORD (TRICKLING FILTER)	4920.71	3215.81	65.4	47.61	422.17	8.6	6.25	445.55	9.1
								6.60	



TABLE III

OPERATING COSTS1965

## PRIMARY PLANTS

PROJECT	DESIGN CAPACITY MGD	ACTUAL FLOW MGD	OPERATING COSTS	MG TREATED 1965	COST/MG \$	COST/LB BOD REMOVED \$	COST/LB SS REMOVED \$
BELLEVILLE	3.0	5.67	45121.81	2070	21.80	0.050	0.023
FORT ERIE	1.8	1.47	24836.97	535.5	46.38	0.119	0.146
FORT FRANCES	2.0	1.84	29310.65	*552.8	52.08	NO LABORATORY ANALYSIS	
FORT WILLIAM	6.0	1.85	53523.57	676.38	79.13	0.234	0.176
OWEN SOUND	3.0	3.39	34109.32	1236.31	27.59	0.061	0.024
POINT EDWARD	0.57	0.197	13272.64	71.180	184.83	0.232	0.116
PORT ARTHUR	4.0	5.16	44533.19	1883.74	23.64	0.034	0.180
PORT DOVER	2.1	0.348	23343.94	126.92	183.93	0.088	0.157
SAULT STE. MARIE	8.0	7.76	122349.41	2631.10	43.22	0.071	0.058
TIMMINS	3.0	2.908	31001.30	1061.286	29.21	0.028	0.018
TRENTON	1.0	0.59	19519.53	214.87	90.84	0.045	0.083
AVERAGE					71.15	0.097	0.098

\* 306 DAYS DATA

## CONVENTIONAL ACTIVATED SLUDGE SECONDARY PLANTS

BRANTFORD	12.5	6.56	185704.83	2395.36	77.53	0.058	0.049
BRAMPTON/CHINGUACOUSY	2.0	2.302	55678.76	840.14	66.27	0.019	0.010
BURLINGTON D. L.	2.5	1.662	37586.43	606.72	61.95	0.029	0.010
BURLINGTON E. G.	0.75	0.822	21966.58	299.86	73.25	0.060	0.054
CONISTON	0.26	0.200	12495.59	72.87	171.47	0.121	0.075
ELMIRA	0.68	0.434	26960.67	158.41	170.20	0.156	0.257
FERGUS	0.60	0.571	21760.15	208.34	104.45	0.031	0.046
GALT	5.0	5.079	73672.49	1853.88	39.74	0.036	0.033
GEORGETOWN	1.5	0.949	31209.58	346.54	90.06	0.155	0.047
HUNTSVILLE	0.25	0.183	9949.50	66.65	149.29	0.110	0.074
KINGSTON TWP.	0.83	0.496	23348.09	181.11	128.92	0.101	0.090
KITCHENER	13.5	9.12	225144.17	3328.10	67.65	0.024	0.018
LAKEVIEW	5.0	7.187	140366.45	2623.25	53.50	0.021	0.022
MARKHAM VILLAGE	0.334	0.32	15909.13	116.88	136.11	0.078	0.051
NEPEAN TWP.	1.5	2.428	32490.61	886.1	36.67	0.087	0.076
NEWMARKET	2.0	1.305	32566.48	476.23	68.38	0.043	0.040
NORTH BAY	4.0	3.781	79171.60	1379.97	57.37	0.059	0.034
ORANGEVILLE	0.75/0.170 SEC	0.593	13525.19	215.853	62.66	0.062	0.079
PORT COLBORNE E.	0.85	1.056		385.429			
PORT COLBORNE W.	0.9DWF/3,600	0.948		346.084			
COMBINED			64498.43	731.513	88.17	0.105	0.077
PRESTON	1.8	0.895	36292.57	326.714	111.08	0.029	0.024
RICHMOND HILL	1.6	1.560	50984.04	569.643	89.50	0.045	0.028
SIDNEY TWP.	0.12	0.22	7677.10	80.53	95.33	0.258	0.129
SINCOE(COMBINED)	2.0	1.549	40344.44	565.531	71.32	0.022	0.035
STRATFORD	4.0	3.13	57079.98	1142.53	49.96	0.026	0.023
STREETSVILLE	0.8	0.548	14565.95	200.115	72.79	0.024	0.023
TILLSONBURG	0.665	0.612	25142.33	223.489	112.49	0.062	0.050
WATERLOO	4.0	2.532	140427.32	924.094	151.96	0.039	0.047
AVERAGE					91.04	0.069	0.056



TABLE III

OPERATING COSTS (CONT'D)

TOTAL OXIDATION PLANTS

PROJECT	DESIGN CAPACITY MGD	ACTUAL FLOW MGD	OPERATING COSTS	MG TREATED 1965	COST/MG \$	COST/LB BOD REMOVED \$	COST/LB SS REMOVED \$
BURLINGTON SKY.	3.125	2.645	51736.82	965,290	53.60	0.026	0.011
FLORA	0.083	0.036	6679.39	13,111	509.45	0.316	0.227
MOORE TWP.	0.32	0.089	12595.65	32,622	386.11	0.215	0.197
PARIS	0.5	0.410	8109.72	149,272	54.16	0.030	0.038
WESTMINSTER	0.25	0.153	18614.93	55,719	190.49	0.108	0.050
AVERAGE					238.76	0.139	0.104
FRANKFORD *	0.12/0.54	0.185	4920.71	67,542**	72.85	0.061	0.057

\*\* ESTIMATED ON NON-RECIRCULATED FLOWS



FIG. No. 1

**1965 OPERATING COSTS  
CONVENTIONAL ACTIVATED SLUDGE PLANTS**

COST PMG TREATED VS DESIGN CAPACITY MGD

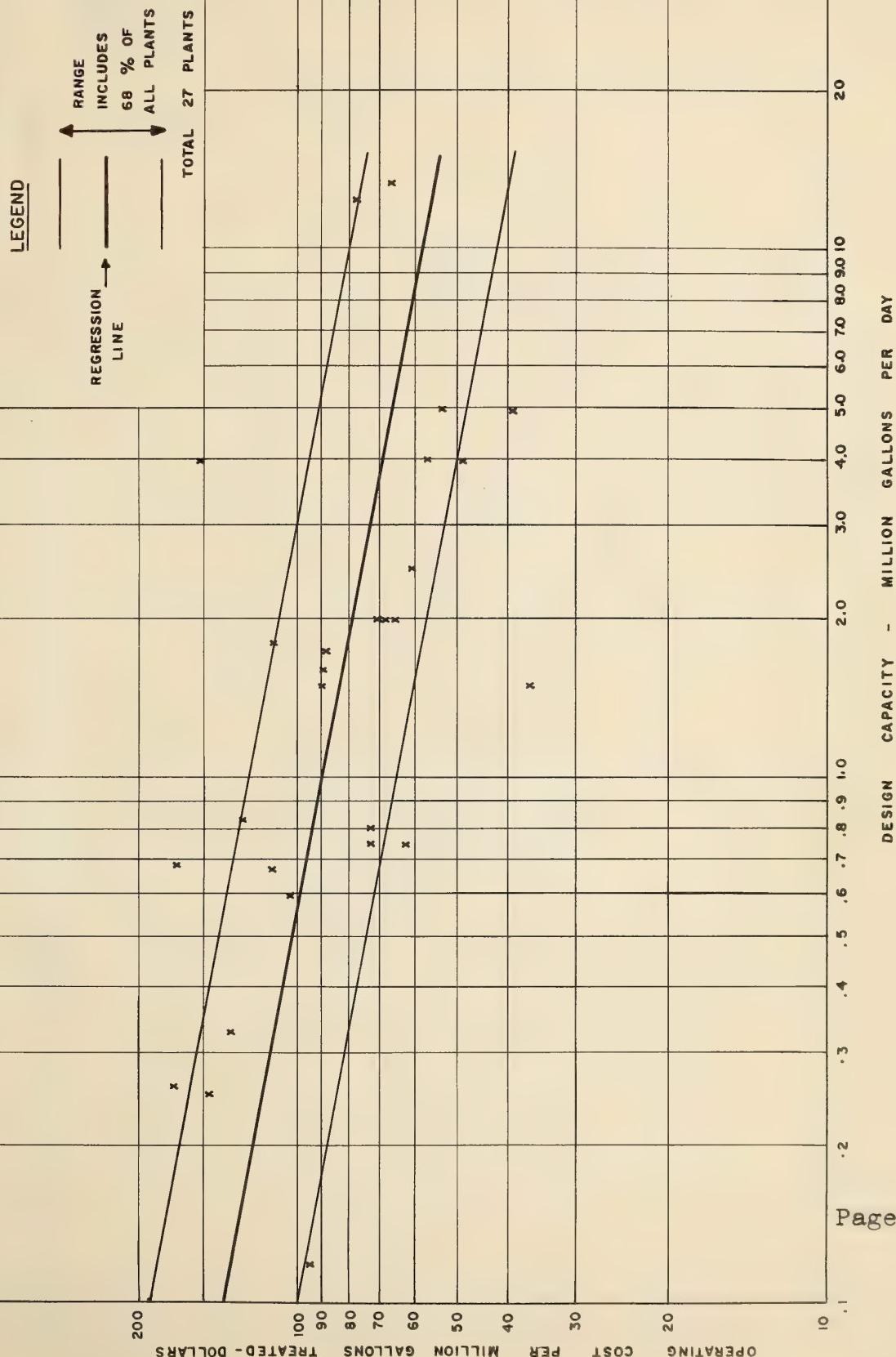




FIG. No. 2

**1965 OPERATING COSTS  
PRIMARY TREATMENT PLANTS**

COST	PMG	TREATED VS DESIGN CAPACITY MGD
500		
400		
300		
200		
100		
90		
80		
70		
60		
50		
40		
30		
20		
10		
0		

## LEGEND

RANGE INCLUDES 68 % OF ALL PLANTS

REGRESSION LINE

TOTAL 11 PLANTS

OPERATING COST PER MILLION GALLONS TREATED - DOLLARS

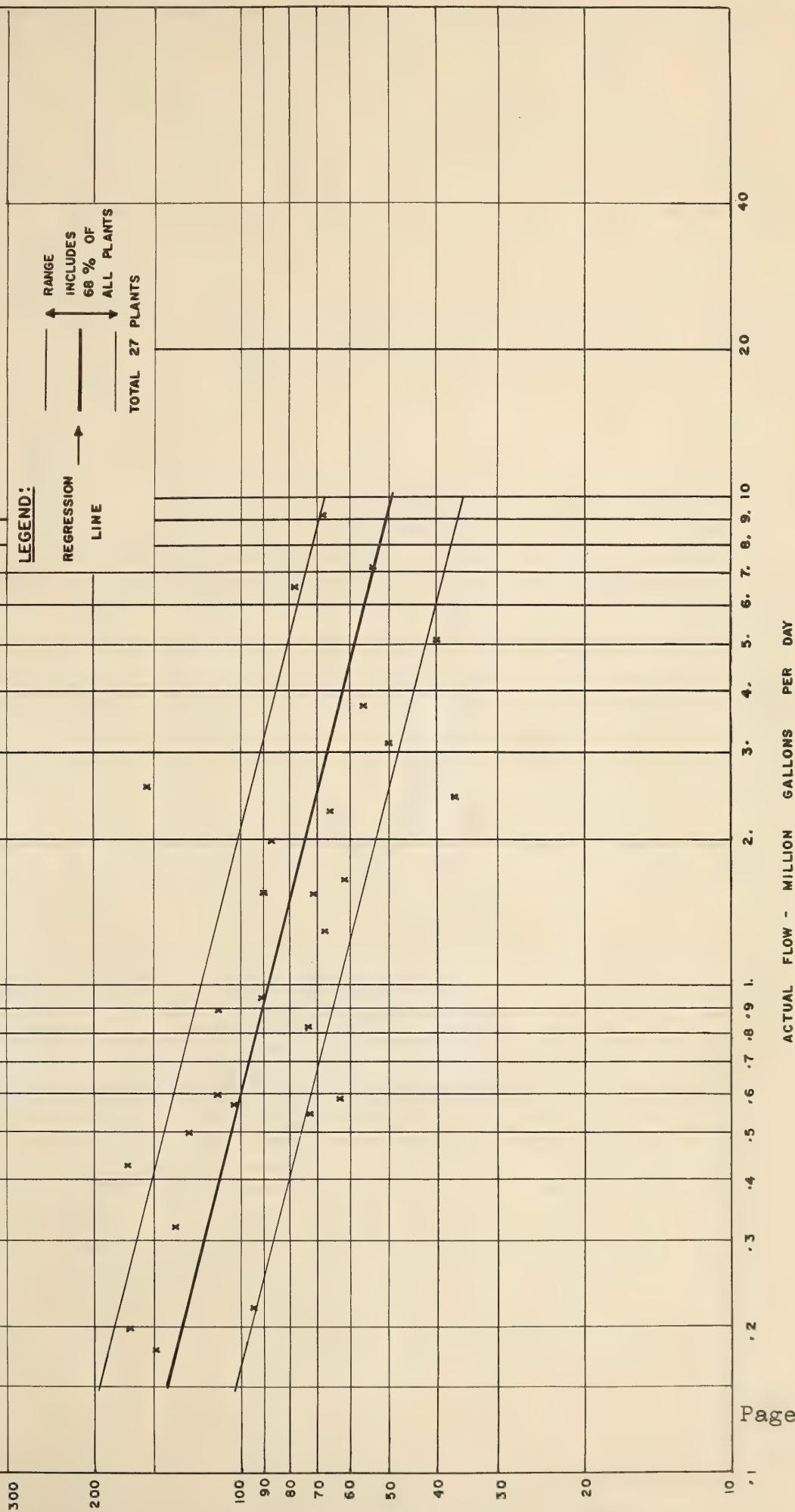
.2 .3 .4 .5 .6 .7 .8 .9 1. 2. 3. 4. 5. 6. 7. 8. 9. 10  
DESIGN CAPACITY - MILLION GALLONS PER DAY

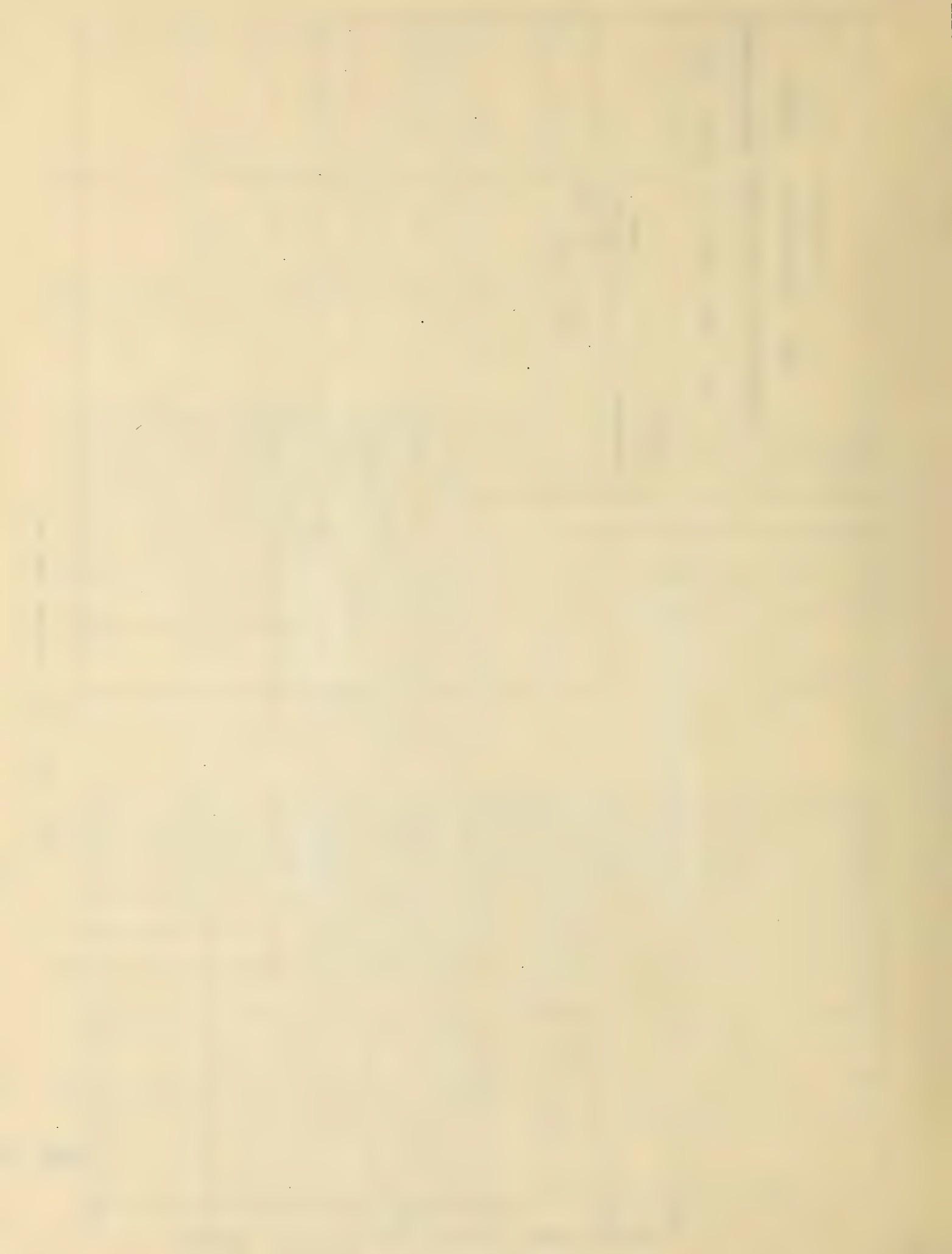


FIG. No. 3  
1965 OPERATING COSTS

CONVENTIONAL ACTIVATED SLUDGE PLANTS

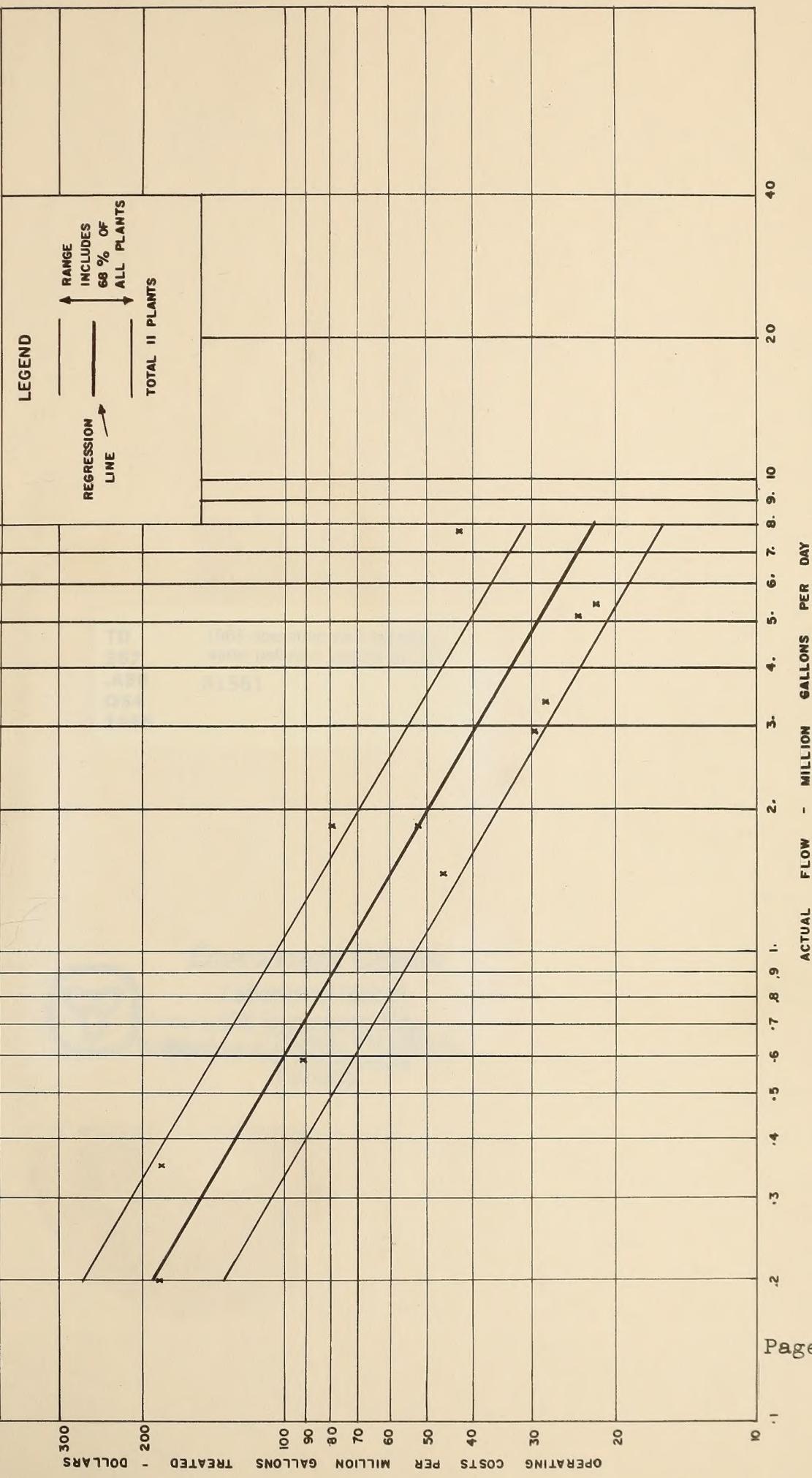
COST PMG TREATED VS ACTUAL FLOW





**FIG. No 4**  
**1965 OPERATING COSTS**  
**PRIMARY TREATMENT PLANTS**

COST PMG TREATED VS ACTUAL FLOW MGD



price to

average cost

BIMARIA EASTMAN PLATES

cost per week to make 8000 sets

revenue

variable cost  
per set

fixed cost  
per week

total cost  
per week

total revenue  
per week

total profit  
per week

total sales  
per week

total cost  
per week

total revenue  
per week

total profit  
per week

total sales  
per week

total cost  
per week

total revenue  
per week

total profit  
per week

total sales  
per week

total cost  
per week

total revenue  
per week

total profit  
per week

**TD** 1965 operating cost summary :  
**367** water pollution control plants.  
**.A56**  
**064**  
**1965** 81561



*Environment Ontario*  
Laboratory Library  
125 Resources Rd.  
MINISTRY OF THE ENVIRONMENT  
Etobicoke, Ontario M9P 3V6  
Canada

